200 Project Proposal

Team Members

Aaron Lin, Siddharth Manu, Stephanie Andrews

Repo

sf-emergency-response-times

Primary Dataset

Law Enforcement Dispatched Calls for Service: Closed (Documentation)

Secondary Datasets

- Police Department Incident Reports: 2018 to Present (Documentation)
- Census Data
- SF Map Geojson
- SF Redlining Map Geojson

Goals

- Analyze incident/crime rates by location and severity
- Characterize current DEM response times and internal (intrinsic) factors that may impact them; eg personnel capacity, proximity
- Identify external factors that may influence response times; eg demographics, wealth

Research Questions and EDA Plan

Priority	Topics/Variables	Questions	Viz Types
1	- `response_time` vs - `incident_severity` - `incident_type` * split by department, fire/ems/police	How does emergency response time relate to incident type/severity?	line bar chart

1	- `response_time` vs - `incident_zipcode`	How does response time relate to location? Are there parts of the city that have better emergency response times?	map bar chart box plot
1	- `response_time` vs - `incident_month` - `incident_year`	How has emergency response times changed over the years? How does response time vary by month? What are possible factors for variance?	heat map trend line
1	- `response_time` vs - `day` - `time`	What are patterns of emergency response with regards to day of the week and to time?	heat map bar chart
1	- `response_time` vs - `police_district` - `police_analysis_neighborhood`	Do certain areas have better emergency response coverage, eg related to police? How might that impact response time? How does that relate to departmental budgets?	bar chart map
2	- `response_time` vs - `population_size`	How might population size/density impact response time?	map scatter plot

2	- `response_time` vs - `race_area_demo` (TBD) - `percent_minority` (?)	How do race and ethnicity relate to response time? Is there a correlation between emergency response times and a greater concentration of minority residents in an area?	scatter plot line
2	- `response_time` vs - `median_household_income` - `mean_household_income` - `income_per_capita` (?)	Do wealthier areas have better police response times?	map w/ layers bar chart
2	- `response_time` vs - `redlined_district`	Do areas that have been historically redlined(have higher HOLC grades) have higher response times?	GeoJSON map
3	Analysis of high-risk areas and call volume/times Crimes grouped by `incident_category`, `analysis_neighborhood`, `zipcode`	When and where are communities most at risk/ most likely to be in need of emergency response? Reference violent vs nonviolent crimes	heat map bar chart map others tbd

3	- `response_time` vs - `police_capacity` - `budget_dem` - `budget_police` - `budget_fire` - `total_budget`	How does police capacity and budget allocated play a role in response times?	Line graph

Report Structure

- Background and Context
  - Related news articles
  - State response time requirements
  - Audience: policy makers, public, businesses
  - Defining data sources, schemas
  - Response times: time between call received and time on scene
- Summary of research questions and sub-questions
- Crime rates and risk
  - Analysis of high-risk areas and call volume/times
  - Crimes grouped by `incident_category`, `analysis_neighborhood`, `zipcode`
  - Visualization ideas: heat map, bar chart
- Average response times:
  - `call_received_dt`, `call_dispatched_dt`, `call_onscene_dt`
  - `number_minutes` (bucket), `incident_count` - trend lines, bar chart
  - `call_type`, `call_priority` - trend lines, bar chart
- Current response times in relation to internal factors:
  - `incident_severity`, `incident_type` - line, bar chart
  - `incident_zipcode` - map, bar chart, box plot
  - `month`, `year` - heat map, trend line
  - `day`, `time` - heat map, bar chart
  - `police_district`, `police_analysis_neighborhood`; `police_capacity_by_district` if available - bar chart, map
  - `budget_dem`, `budget_police`, `budget_fire`, `total_budget`
- Current response times in relation to external factors:
  - `redlined_district`, GeoJSON - map

    - `population_size` - map, scatter plot
    - `race_area_demo` (TBD), `percent_minority` (?) - scatter plot, line
    - `median_household_income`, `mean_household_income`, `income_per_capita` (?) - map w/ layers, bar chart
- Implications and Further Analysis
    - Impact on businesses, loss of life, etc.
    - Additional factors - traffic, cell signal
    - Actionable insights